Crouch was engaged had for its object to connect a number of settlements on the West Coast of Africa from Bathurst to St. Paul de Loanda, and belonging to the British, French, Spanish, and Portuguese. Although it is fixed beforehand what places are to be connected, it is only when the ship arrives on the ground that the exact place of landing, the amount of assistance to be got from the shore, and a host of matters of minute local detail, but of great importance, can be settled, and to do so satisfactorily, expeditiously, and without friction, requires qualities of a very high order in the chief of the expedition. How difficulties were overcome, dangers met, and accidents repaired, in the course of the laying of one portion of the West African Company's cables is told in a pleasant and readable way in "On a Surf-bound Coast." Mr. Crouch carries his descriptions only as far as Cutanu, a French settlement lying between Accra and Lagos. From this place the cable was taken to the Portuguese islands St. Thomê and Principe, the French settlement on the Gaboon, and the Portuguese town St. Paul de Loanda; but this part of the expedition is reserved for description in a possible future volume.

The narrative begins with the start of the s.s. *Thracia* and her consort the *Pioneer* from the Thames, under the chief command of Mr. White. The names of persons and ships are purposely altered. The work really begins with their arrival at Bathurst, the chief British settlement in the Gambia district. In the previous year the cable had been laid as far south as the French settlement Conakry, about 70 miles north of Sierra Leone; and outside of Bathurst the cable, coming from the Cape Verde Island of St. Jago, had been joined to it, forming a T piece. Their first job was to cut out this piece, and run the three ends, leading respectively northwards to Dakar, westwards to St. Jago, and southwards to Conakry, into Bathurst. This affords the author an opportunity of describing the operations of "picking up" in shallow water, also of laying shore ends in protected water, and of splicing cables. In this Mr. Crouch acquits himself fairly well; indeed, it is very difficult to make intricate mechanical operations of the kind quite intelligible to the uninformed without the use of drawings. In the course of these operations the two ships each passed a portion of their time on the sand-banks, which are here plentiful and almost completely unsurveyed.

The next piece of work was connecting the French settlement Conakry with Sierra Leone. Here, again, there was no dearth of incident, as the *Pioneer*, in landing the shore end, went on a rocky patch, and was with difficulty got off. During the laying the cable got round the propeller, and might have caused great delay but for the promptitude and courage of Mr. White, who, without hesitation, went overboard and dived straight down to the propeller, and on coming up ordered "three half turns more in the same direction," when the cable came free. There are many other instances scattered through the book of the resource, energy, and perseverance required for success in this kind of work.

The *Pioneer* was obliged to return home, and the *Thracia* left Sierra Leone alone and proceeded round the coast, landing shore ends at Grand Bassam, Accra, and Cutanu or Appi. The company's larger steamer, the *Copperfield*, meanwhile came out with the bulk of the cable, and connected these shore ends. Mr. Crouch was transferred to the *Copperfield*, and assisted at the laying of a portion of these cables, and he was landed at Accra, along with two other members of the staff, to attend that end of the cable, which, for the time being, had a blind end buoyed out at sea. It was the duty of these gentlemen to watch night and day the spot of light on the scale of the galvanometer, so as to be ready to answer whenever the ship picked up the end and "called" them. The fatigue and monotony of this weary work of waiting and watching is well described. There are also interesting descriptions of Accra and its inhabitants. Indeed, the latter half of the book is by far the more interesting; there is more business in it and less of the jokes and chaff of the quarter-deck, which, though useful and even amnsing at the time, seldom possess sufficient permanent value to justify their being printed at any length.

The book, taking it all round, is a useful and entertaining one, and as a first attempt is altogether creditable and full of promise. In any future work the author should not be afraid of tiring the reader by careful and detailed description of any operation of interest on which he may be engaged. Outside of those directly connected with the business or the profession, the general reader knows nothing of the methods of laying and working submarine cables.

J. Y. B.

TEXT-BOOK OF GUNNERY.

Text-book of Gunnery, 1887. By Major G. Mackinlay, R.A. (London: Printed for Her Majesty's Stationery Office by Harrison and Sons, 1887.)

TO realize the great alterations which have taken place in artillery in the last twenty years it will be necessary to compare the present work with the corresponding "Treatise on Artillery" of 1866, prepared for the use of the Practical Class, Royal Military Academy, in which there is no mention of rifled artillery, iron armour, or electro-ballistic apparatus, and the Practical Class were expected to go forth fully equipped to compete with any foreign enemy with the smooth-bore gun, the spherical projectile, the formulæ for penetration into earth, and such information on velocity and resistance as the ballistic pendulum could afford. If twenty years can make such alterations in the science of artillery, imagination attempts to penetrate the future and to gather some information as to the view in which the present treatise of 1887 will then be held.

Official treatises, however, must not be criticized according to the irreverent sceptical rules of modern scientific inquiry. The authors are prevented by military discipline from expressing any opinion on the merits of the weapons they describe, even when of an experimental nature. Thus the Armstrong rifled gun had been in serviceable use for seven or eight years, and Mr. Bashforth had been experimenting with his chronograph on elongated projectiles and the resistance of the air to their flight for nearly two years, before the appearance of the 1866 edition of the "Treatise on Artillery"; and, coming to the present edition, we find little or no mention of such important matters as steel shields for the protection of the gunners in the field against bullets (*vide* reports on the Boer War),

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the importance of range-finders in lessening the amount of ammunition to be carried in the limbers, the dynamite gun for use in sieges, and other modern developments.

After the Battle of Waterloo we went comfortably to sleep on our laurels, and awoke to find ourselves engaged in the siege of Sebastopol with exactly the same weapons we had employed in the Peninsular War. Sebastopol with modern weapons could have been taken with one-tenth of the hundreds of millions that were lavished ; so it is important for the future that the taxpayer should take an intelligent interest in military preparations and see that we are provided with the very best weapons that money can procure. Such an intelligent public has been educated in the Volunteer force, and these "men with muskets" are not prevented by military discipline from criticizing their muskets, or equipment in general ; and it is to them that we owe the healthy criticism that has lately been exercised on our armaments and state of military preparation.

Hotspur's description of the regular military officer saying : "It was great pity, so it was, that villainous saltpetre should be digged out of the bowels of the harmless earth, which many a tall fellow had destroyed so cowardly ; but for these vile guns," &c., is true to this day ; for the modern artillery officer's pride in his gun varies inversely as the weight, for certain tangible reasons ; and generally a soldier looked upon his weapons as something to keep clean and to drill with until some recent warfare taught him the importance of the despised musketry instruction. The officer's attention is fully occupied in attending to the drill and discipline of his men according to the regulations ; and we find that the scientific development of methods of destruction is generally due to amateur civilians like Benjamin Robins, of Quaker extraction, the father of modern gunnery, and the Rev. Mr. Bashforth ; while the Gatling gun is a product of Philadelphia, the City of Brotherly Love. Clerk's "Naval Tactics," written by John Clerk of Eldin, a relative of Prof. Clerk Maxwell, and an Edinburgh barrister, was the treatise which put a stop to the ineffective naval engagements of the last century—ineffective because culminating in the failure of the fleet to relieve, and the consequent surrender of, Yorktown.

Major Mackinlay's treatise appears to be very carefully compiled, and taking into account the restrictions under which the author works, it is fully up to date with the development of our own artillery ; whether with the artillery of foreign countries is another question. We notice, however, with some regret that the guns illustrated in the text are all muzzle-loaders, as if breech-loading was the temporary fad which the rifled gun was considered in the time of the treatise of 1866.

A valuable chapter on steel, new in this edition of the treatise, reminds us that our authorities are now after thirty years' delay taking up the Whitworth method of construction of ordnance, omitting, however, the Whitworth hexagonal bore. An official Solomon gave decision in favour of Armstrong against Whitworth in their celebrated competition, with the effect of alienating the greatest steel manufacturer of the world from Government purposes. His great prototype would have encouraged now one and now the other, without committing himself to an absolute decision, and would thus have reaped for his country the benefit of the invaluable services of both competitors.

Major Mackinlay has done good service by collecting all the ballistic tables based upon the important experiments of Mr. Bashforth, and by showing how they are applied to the questions of artillery. We must be on our guard, however, against using ink instead of gunpowder, from economy, and against imagining that there is no further need of careful experiment and practice. It is of the greatest importance, too. that cadets should learn from this treatise that the science of artillery is not entirely comprised in guns of the smallest dimensions, manœuvred over rough country, and the doing of some snap shooting The history of recent wars teaches us that the field artillery of both sides is used up in the first two or three engagements, and that the conflict finally resolves itself into a vast siege, in which the whole army and navy are converted into garrison artillery.

The article by the author of "Greater Britain" in the *Fortnightly Review*, tells us of the immense pains now taken on the Continent in military preparations. Let us avoid in time the necessity of the dreary up-hill labours which the French have been compelled to undertake, now at length beginning to culminate in an organization which, it is important to keep in mind, might at any moment be tested by being brought to bear against this country.

ROMANTIC LOVE AND PERSONAL BEAUTY.

Romantic Love and Personal Beauty. By H. T. Finck. Two Vols. (London : Macmillan and Co., 1887.)

IN dealing with the subject, or, rather, the group of subjects, here indicated, Mr. Finck seems to have had before him a twofold object, scientific and practical. On the scientific side he deals with romantic love, showing (*a*) that it is a recent growth, (*b*) what are its conditions, and (*c*) what are the conditions of beauty as essential to romantic love. From a practical point of view he (*a*) gives rules for health, which is essential to beauty and therefore to romantic love, and (*b*) insists upon the necessity of free choice in love being left to young people. Let us see briefly what he has to tell us upon these points.

Goldsmith, in the "Citizen of the World," was wrong, Mr. Finck holds, in teaching that love proper existed in ancient Rome. "Romantic love is a modern sentiment, less than a thousand years old. . . . Of all personal affections the maternal was developed first, and the sentiment of romantic love last." Here Mr. Finck has certainly got hold of a truth, but he puts it much too strongly. There is nothing improbable in the growth of a new emotion, or (as we would rather say) in an old emotion receiving a new direction and a great expansion. Vol. I. (pp. 34-37) shows that parental and filial love have little or no existence among animals and among some savages ; and if civilization can develop these feelings to their present pitch of intensity, it might well do the same for the mental, as distinguished from the bodily, attraction between man and woman. But the modern form of love is not a new feature ; it is essentially a development. It was stunted and kept down at Rome and in most of Greece but still it was in existence ; and, if Mr. Finck will extend

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